

January 24, 1997

VPCD-97-01 (DYNO/LDV/SM/ICI/LIMO)

Dear Manufacturer:

Subject: New Guidance on Testing Vehicles with Knock Sensors

On July 31, 1996, the American Automobile Manufacturers Association and the Association of International Automobile Manufacturers requested relief from EPA's policy requiring vehicles equipped with knock sensors to be tested with 91 RON (research octane number) gasoline. This letter was the result of discussions being held between manufacturers and EPA on ways to streamline the vehicle compliance programs. Although the bulk of the streamlining changes will be proposed in rulemaking, EPA has agreed to pull ahead some changes that do not require rulemaking so that manufacturers can derive immediate benefits.

The purpose of knock sensors is to detect the onset of engine knock and make corrections in engine operating characteristics (usually by retarding the spark timing) to avoid further knocking. Engine knock is usually caused by using gasoline with insufficient octane rating. EPA test fuel is typically 96 RON, which is roughly equivalent in octane rating to premium gasoline in use. When manufacturers first introduced knock sensors to optimize spark timing, EPA became concerned that vehicles could be optimized for 96 RON gasoline and operate in use with retarded spark timing on regular gasoline. Both emissions and fuel economy performance in use could thus be different than predicted.

Under the provisions of section 27 of 40 CFR Part 86, EPA began to require manufacturers to show, prior to certification, that knock sensor equipped vehicles could operate on 91 RON gasoline without effecting emissions or fuel economy. To do this, manufacturers have to demonstrate that the knock sensor output does not alter spark timing during FTP operation, or that the

fuel economy difference between 96 RON testing and 91 RON testing is within 3 percent. Either option requires the manufacturer to run special testing.

AAMA and AIAM requested that EPA allow manufacturers to submit a statement attesting that the knock sensor is not a defeat device, as "justified" by one or more criteria listed in their request (see enclosed letter). EPA agrees in principle that routine testing to assess knock sensor operation is no longer necessary. EPA has rarely found that knock sensors come into play when tested with 91 RON fuel. There is no likely motivation for a manufacturer to design a calibration that results in spark retard while operating on recommended regular octane gasoline. Therefore, in lieu of test data, EPA will require that manufacturers submit a statement attesting to one or more of the following:

1. The knock sensor does not activate in any way during the FTP (or the SFTP as applicable) and the HWFET, and the calibration is designed to operate on 91 RON gasoline without the need for spark adjustment.
2. The city and highway fuel economy test result differences between comparing 91 RON operation and 96 RON operation is within 3%, and there are no emissions increases (beyond normal test variability) using 91 RON fuel when tested on the FTP (or SFTP as applicable).

EPA reserves the right to verify, or require the manufacturer to verify, either of the statements by testing vehicles. If such testing results in 91 RON fuel economy decreases beyond 3% or increases in emissions beyond normal testing variability, the knock sensor could be deemed a defeat device.

We believe that given the history of finding no problems with knock sensor operation and the continued ability of EPA to verify manufacturers' statements, the risk of unrepresentative fuel economy results and increased emissions in-use is extremely low. This action, as pointed out by AAMA and AIAM, will result in an annual savings for manufacturers of over 200 city and highway tests, which could save as much as \$1 million annually.

Sincerely,

Jane Armstrong, Director
Vehicle Programs and Compliance Division

Enclosure